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MAY 27, 1950

SCIENCE NEWS LETTER

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THE WEEKLY SUMMARY OF CURRENT SCIENCE

First Fair Finalists

See Page 326

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ASTRONOMY-GEOLOGY

From Now On: The Earth

The origin and age of earth are still mysteries to be penetrated by research. The findings, however, should never be regarded as dogma.

By WATSON DAVIS

Ninth in a series of glances forward in science.

➤ IF there is anything solidly known, it would be logical to suppose that it is the earth beneath our feet. Yet today there is less assurance than ever before about what lies within the earth, a mere few thousands of miles below us. There is even less agreement and positiveness about the origin of the earth.

We do know that the stuff of the central core of the earth must be about four times as heavy as the surface rock layers, which means that it is twice as dense as the densest materials known at or near the surface. The core is in a state of great compression.

There seems little doubt but that there are three distinct layers lying upon the earth's central core: The surface crust about 30 miles thick with rocks about three times as heavy as water, then a 720-mile layer of density four, and about a 1000-mile layer of density 5 to 6, and then the strange center of the earth which is density 10 to 13. Earthquake waves give us this information.

Geologists have long abandoned ideas of a "hell and brimstone" interior of the earth. Volcanoes give us no clue to what is deep within—for their molten lava is strictly on the surface, liquefied by temporary release of pressure.

Even the idea that the earth's surface was once molten is not in scientific favor now. Flow of the earth's materials deep within the globe is due to the enormous pressures. Under pressure the most solid stuff will move like so much liquid. But the surface of the earth, unlike that of the moon, does not have signs of having been molten.

The history of the earth goes back some three billion years or so when the earth was formed in some manner out of the nebula that gave birth to the sun and the other planets. You can take your choice of theories of the origin of the sun and planets, but the most recent of them returns to something akin to Kant's idea of a whirling cloud of dust out of which the bodies seem to have been accumulated.

There are many chemical puzzles in the rocks of the earth when scientists try to fit them into the geological picture. Why does the earth have as much water as it does? Dr. Harold C. Urey, Chicago Nobelist, who has turned from nuclear chemistry to earth chemistry these days, finds enough chemically combined water in the large amount of serpentine in the earthly rocks to account for the water.

The earth's origin is but one step in the process of providing a platform in time and space for the human race. Where did the original gas and dust come from? How can hot bodies like the sun and other stars be created out of cold gas and dust? There are theories, of course, and plausible ones at that.

But when some of the steps seem to be understood, someone asks: "When did time begin?" Then the question must follow: "What kind of time?" We are told earth's rotation (our clock) is slowing down one-thousandth of a second a century compared with the other planets. The quest for positiveness may be as endless—one hardly dares say—as time.

While we worry about the H-bomb, there are many deep mysteries that we can afford to strive to fathom, given the peace to do so. We may hope:

A. Astronomers, geologists and other scientists will ponder whence came and whither goes the solid earth beneath our feet and the stars over our heads.

B. Amidst our preoccupation with discoveries for new weapons, for the fight against world starvation, for countering disease, for new industries, we shall take a little time to inquire what it was in the beginning and whether it always will be.

C. Our ideas of past and possible future may never become dogma, for then our intellectual children will disown our brash finality.

Science News Letter, May 27, 1950

MEDICINE

R48 for Incurable Cancer

➤ A NEW drug has treated successfully some cases of hitherto incurable cancers of the lymph glands, bone marrow and other blood-forming tissues.

Dr. W. B. Matthews of Oxford, England, announces these successes to the medical world through a report to the British journal, LANCET (May 13).

The cancer-treating drug is called R48 and chemically it is beta-naphthyldi-2-chloroethylamine.

Dr. Matthews used the drug on patients with Hodgkin's disease, reticulosarcoma, acute and chronic leukemia, in which the white blood cells are affected, and in one case of polycythemia, in which the red blood cells run riot.

The polycythemia patient was completely cured and is still well one year after the end of treatment. One of the chronic lymphatic leukemia patients who was at the point of death became well enough under treatment to return to his job as stationmaster. A second victim of this disease also responded well to treatment with R48, but two others failed to get any major benefit and died.

Two successes were chalked up against chronic myeloid leukemia, but here, too, there was a failure to record. Against Hodgkin's disease aand reticulosarcoma, R48 was disappointing.

The new drug, first synthesized by Dr. A. Haddow, world-renowned English cancer research scientist, is a modification of the poison war gas chemical, nitrogen mustard. Nitrogen mustard has itself been used with some temporary success against blood cancers, but in every case treatment has had to be suspended because of its severe toxicity and because it soon blocked the veins into which it was injected.

R48 has the great advantage of being effective by mouth. Tablets of it are chewed by the patients after meals. It is much less nauseating than nitrogen mustard. Only one patient out of 17 treated had to stop taking the new drug because of excessive stomach upset.

R48 is not the final answer to the blood cancers, it is felt, but it is considered a step along the road toward the right answer.

Dr. Matthews was recently resident medical officer at Churchill Hospital, Oxford.

Science News Letter, May 27, 1950

MEDICINE

Identify Heart Disease From Recorded Heartbeats

➤ A TERRIER'S heartbeat recorded on a phonograph record offers Cornell University veterinary students a new way to detect faulty "tickers" in small animals. Purpose of the record is to help the students diagnose heart ailments correctly.

The record was made with a tape recorder connected to a stethoscope and a phonograph record-cutter. The heartbeat is that of a 12-year-old rat terrier suffering from an unusual type of cardiac irregularity.

Advantage of this medical recording, says Dr. Irving Stern, is that all students may now hear the same type of heart defect at one time and interpret it correctly. Furthermore, it eliminates the usual uneasiness of animals under inspection.

Formerly it was difficult to get an animal with the abnormality needed for the study of a particular type of defect. The correct sound is now permanently recorded and filed for future use.

Science News Letter, May 27, 1950

MEDICINE

Anti-Polio Human Milk

An anti-polio substance has been found in the human mother's milk. It has also been found in the milk of some cows, but the majority of them do not have it.

➤ DISCOVERY of an anti-polio substance in human mother's milk was disclosed in Baltimore by Dr. Albert B. Sabin of the Children's Hospital Research Foundation of Cincinnati.

The substance has also been detected in milk from some individual cows in certain herds, but the majority of cows do not have it.

The nature of the anti-polio substance is not yet known. It is not related to the presence of antibodies, or polio fighting substances, in the blood. When mother's milk containing the substance is pasteurized the anti-polio material is not destroyed. Dr. Sabin does not know whether pasteurization destroys it in cow's milk.

The substance has been found in every sample of mother's milk so far examined up to five days after the birth of the mother's baby. It is present in 75% of mother's milk from one month to 340 days after the baby's birth.

This anti-polio stuff in mother's milk probably explains why there is no paralysis although polio infection is widespread in some regions of the world, such as the Far East where babies are nursed by their mothers until the age of three or four years. It also explains why the children who did not get paralytic polio during the outbreak among Canadian Eskimos recently were the babies still being nursed.

The substance was mixed with infantile paralysis virus and injected into mice brains. None of the animals got paralytic polio.

Calling the discovery an important lead in polio research, Dr. Sabin said he is now working to find what the substance is and then will try to find some way of making it practically useful. "An anti-polio certified milk," he said half humorously, is the objective of the research.

Discovery of this anti-polio substance in milk was announced at the meeting of the American Pediatric Society, Dr. Sabin told members of the Society of American Bacteriologists.

Science News Letter, May 27, 1950

ENGINEERING

Robot Does Human Work

➤ A MECHANICAL hand, operated by human hands manipulating switches within a protection booth, is performing delicate tasks in a dangerous radioactive area at the Hanford Works of the U.S. Atomic Energy Commission in Richland, Wash.

The mechanical hand is a part of a five-ton machine on wheels that resembles a railroad handcar, with a small-caliber gun mounted on it. The gun-like part is a telescoping arm, with double clamps at the end. The arm can be extended, shortened, raised or lowered by remote control. Its hand is capable of a wrist-bending motion, rotation and gripping.

The device is a development of the General Electric Company, Schenectady, N. Y., which operates the Hanford plant to produce plutonium for atomic energy applications. The operator, in his protected booth, can see some of the work being done by direct sight and part by mirrors. Also the control panels are equipped with lights which indicate the position of the mechanical hand when it is impossible for him to see the work otherwise.

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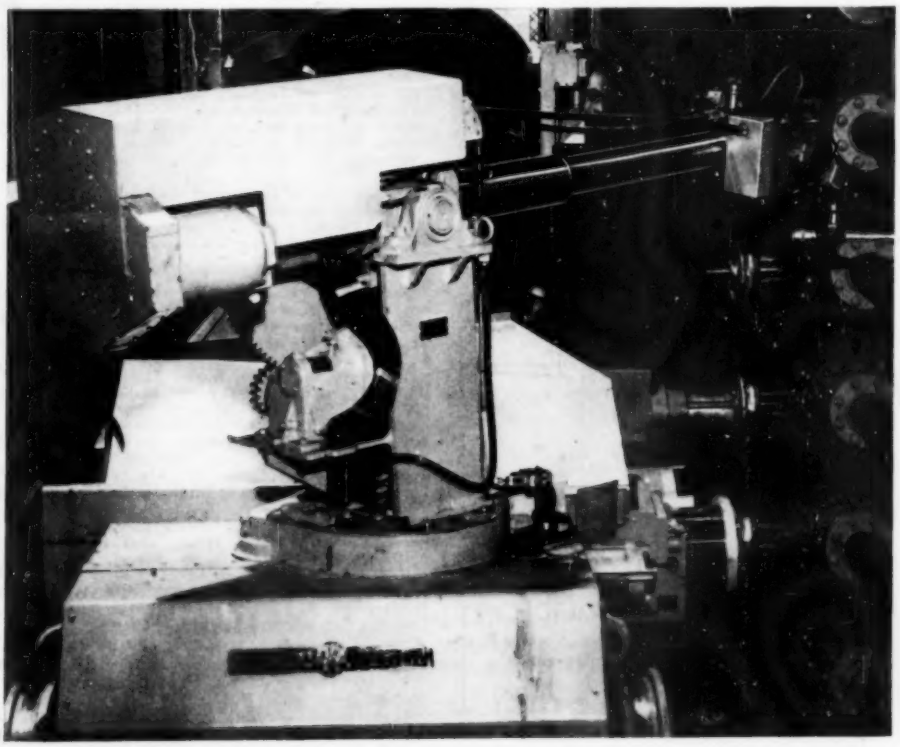

ONE-ARMED ROBOT—One of the five-ton "tool dolly's" jobs at Hanford is turning valves. The valve-turning attachments are equipped with electric "feelers." The apparatus moves about its work area on tracks.

INVENTION

Lapel Handkerchief Faked; No Work in Brushing Shoes

➤ THE "well-dressed" man can now have an imitation handkerchief that never will get disarranged in the lapel pocket of his coat and he can brush his shoes without soiling his hands or even stooping over.

Thanks are due to two ingenious inventors who received patents from the government. Donald A. Ripple of San Francisco is the inventor of the imitation handkerchief and he received patent 2,507,049. Frederick E. Hummel, Chicago, earned patent 2,507,407 for a foot-operated shoe-brushing device.

The carefully folded handkerchief in the lapel pocket, worn for decoration and not for use, easily gets disarranged. This imitation can not. It is a flat square of fabric which has a decorated top edge.

The shoe-brushing apparatus has a platform on which the foot is placed. By foot-pressure and a spring a center part is pumped down and up. This pumping gives rotary motion to a number of brushes to clean the shoe.

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ENGINEERING

New Better Refrigerant

➤ A NEW and more efficient refrigerant for use in air-conditioning and refrigeration, developed by Carrier Corporation, Syracuse, N. Y., promises economy because with it fewer machines are required to do the same number of jobs. It produces a higher refrigerating effect.

It will be known as Carrene-7. It was developed under the direction of Dr. William A. Pennington. In the work he was assisted by Winston H. Reed, holder of a Carrier fellowship at Syracuse University.

The new refrigerant is a carefully proportioned mixture of two fluorinated hydrocarbons. One is Freon-12. The other is Genetron-100. Chemically, Freon-12 is dichlorodifluoromethane. The additive is an unsymmetrical difluoroethane.

An important property of the mixture is that it always boils at the same constant temperature corresponding to a particular pressure. In technical language, it is an azeotropic mixture.

Carrene-7 possesses all the desirable properties required for a safety refrigerant, and also permits a reciprocating compressor charged with it to produce a substantially greater refrigerating effect.

Carrene-7 satisfies all of the important requirements for a useful refrigerant, it is claimed. It is chemically stable, non-inflammable, physiologically safe, and does not attack or corrode the common materials of construction.

Another property, important to technical men, is that it solves the 50-cycle problem. It provides almost exactly the same capacity with 50-cycle current as Freon-12 does with 60-cycle current. It has a capacity about 18% higher than Freon-12 where the same compressor is employed at the same speed. In fact, its discovery came as a result of a search for a refrigerant which, when charged into a hermetic system designed for Freon-12 and 60-cycle power supply, would maintain the same capacity when 50-cycle power was used.

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PSYCHOLOGY

Fast Reading Needed For College Success

➤ A COLLEGE student must be a fast reader or he cannot keep up with his work.

Unless a student has an average reading speed of about 350 to 400 words a minute, he will be overwhelmed by the reading demands made on him. This is what Dr. Stella S. Center, director of the Reading Institute of New York University, told the American Society for Engineering Education convention in Bethlehem, Pa.

But comprehension is even more important than speed, Dr. Center pointed out.

"The student must be able to translate words, figures, equations, formulas into concepts that have meaning for him," she said. "The mental operation is the same, whether it is focused on one of Shelley's sonnets or an equation of Einstein."

Still, if the student does not have reading skills when he gets to college, it is not too late for him to develop them, Dr. Harry T. Hahn, director of the Reading and Study Clinic of Lehigh University, told the same meeting.

A survey made three years ago related that 65% of the class of 1951 at Lehigh felt that they had poor reading skills or inadequate study habits.

These skills can be developed, Dr. Hahn declared. "Improvement programs in many colleges and universities give proof of this."

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Question Box

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GENERAL SCIENCE

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MEDICINE

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Photographs: p. 323, General Electric; p. 325, Westinghouse; p. 336, Tennessee Eastman Corporation.

● RADIO

Saturday, June 3, 3:15-3:30 p. m. EDT

"Adventures in Science" with Mr. Watson Davis, Director of Science Service.

Dr. Philip Morse, Deputy Director and Director of Research of the Weapons Systems Evaluation Group, Office Secretary of Defense, will talk on "Using Science To Help Run Things."

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BACTERIOLOGY

Antibiotic Preserves Food

The miracle drug, subtilin, kills the microorganisms which contaminate food. It cuts canning time and leaves the food with the garden-fresh flavor.

➤ TOMORROW'S canned goods will come off grocers' shelves tasting as fresh as food from your own garden. Their secret, now being realized in laboratories of the Department of Agriculture, will be tiny amounts of a gray-green powder named subtilin. Subtilin is an antibiotic.

Thus is being uncovered a whole new field in which these new miracle drugs called antibiotics will work their wonders. Without freezing, and without the flavor-draining high temperatures necessary in present-day canning methods, a revolutionary new method of preserving foods with these drugs is being tested by government scientists.

Drs. Ariel A. Anderson and H. D. Michener, bacteriologists at the Department of Agriculture's Western Regional Research Laboratory at Albany, Calif., reported some of the results to members of the Society of American Bacteriologists in Baltimore.

Subtilin, discovered at the Western Regional Lab, has proved extremely effective against some of the micro-organisms which contaminate food and which, if left in the can, quickly spoil it.

By using minute amounts of the drug dissolved in a salt solution and put in the cans, the researchers have preserved a wide variety of vegetables and other foods for nine months—ever since they went into storage—without a trace of spoilage.

The test foods include peas, asparagus, corn, green beans, peeled potatoes, tomato juice, milk, cauliflower, Brussels sprouts, broccoli, wax beans and mushrooms.

A vital part of the new process is still heat—but for a much shorter time and at much lower temperatures than conventional canning methods require.

It has been found that subtilin kills the food-spoiling organisms which survive moderate amounts of heat. In turn, the mild heat treatment destroys those which are unaffected by subtilin.

Other antibiotics—aureomycin, chloromycetin and lupulon, the latter isolated at the government laboratory from hops—have shown definite promise. But the work so far has been confined largely to subtilin.

The substance is being produced on pilot-plant scale in a fermentation process employing a strain of *Bacillus subtilis*. This organism occurs widely in nature and is found in many foods.

Yet the experimenters are treading with care before they announce they have a revolutionary new canning method. They want to be absolutely sure the antibiotic will have no ill effects on the consumer.

The amounts used in each can are so tiny as to be undetectable by taste or sight. Ten parts per million, based on the weight of the food treated, produces complete sterilization. The cans stay in boiling water 20 minutes at the maximum time.

In other terms, the canner would need 18 grams of the antibiotic, little more than half an ounce, to treat a ton of food. The cost would be about a tenth of a cent per can, the scientists have estimated.

Tested with rats and rabbits, massive doses of subtilin have produced no ill effect. All tests indicate that it is non-toxic in the human stomach.

Nevertheless, several years of work will probably be needed before the new process can be turned to general use, Dr. G. E. Hilbert, chief of the Bureau of Agricultural and Industrial Chemistry, indicated.

"A good beginning has been made, and the results so far look promising," he said.

By eliminating the long cooking time now required, often in expensive pressure equipment, the most notable result may one day be canned foods with farm-fresh flavor, competing on even terms with the frozen foods in the grocer's refrigerator.

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ENGINEERING

Reflector Keeps Waves Coming Around a Mountain

➤ BOUNCING radio waves around mountains solves a communication problem for the Pennsylvania Electric Company, it was revealed in Johnstown, Pa.

The problem was communication between a generating plant at Seward, Pa., and a sub-station near Johnstown. Rugged mountains between the two sites would make the installation of a telephone line difficult. Microwave communication is the answer. Its success depends upon a unique reflector which makes it possible to send the high frequency radio waves up one valley and down another so that the mountains do not interfere with the trip.

Microwaves, unlike ordinary radio waves, travel in straight lines. They will not pass through a mountain. The reflector used in this installation is on a mountain top in "line-of-sight" with both the generating plant and the sub-station.

Westinghouse engineers, together with engineers of the Pennsylvania Electric Company, are responsible for the "bouncing" technique adopted. The reflector is a 20-foot square sheet of aluminum, standing nearly vertical, supported on a 50-foot tower.

The aluminum sheet is perforated with many one-inch holes. These make it much less resistant to the wind, and do not interfere with efficiency. Because the holes are relatively small, the waves do not pass through them but are reflected.

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INVENTION

Window Washing Is Inside Job with New Device

➤ NO need to stretch an arm outside the window to clean the outer surface, thanks to an American inventor. Just rub a special cleaning pad over the inside of the pane of glass and a similar pad on the outside moves along with it.

Magnetism is the secret. Both pads have within them permanent magnets. The magnetic field extending through the glass between them is strong enough to hold the pads in position opposite each other, even causing the outer one to follow the movements of the other.

The inventor is Rocco D'Andrea of Long Island City, N.Y. A patent was awarded him, number 2,507,559. The use of permanent magnets is the feature of his device. Somewhat similar window cleaners developed before used electromagnets but were not satisfactory, he claims.

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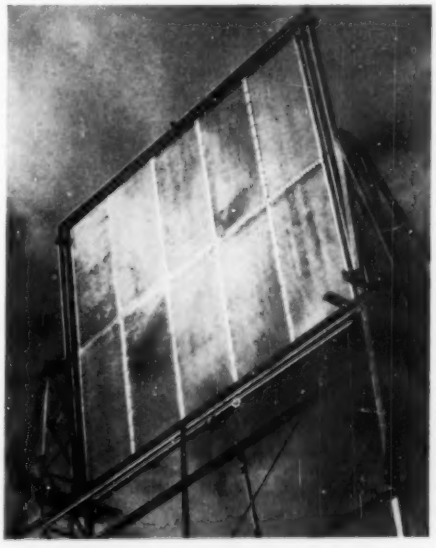


PLENTY OF BOUNCE—High-frequency radio waves or micro-waves strike this perforated aluminum reflector and bounce off at just the right angle to strike a receiving tower 12 miles distant. The sheet, which measures 20 feet square, is supported by a 50-foot tower erected on a mountain top.

GENERAL SCIENCE

First National Science Fair

Winners in the First National Science Fair ever to be held are named. Millikan says that peace and plenty can be brought about through the effort of science.

➤ ANTIBIOTICS, the laws of motion, chemistry and plant science: complicated exhibits in these four fields won first place awards for two boys and two girls at the First National Science Fair in Philadelphia's Franklin Institute.

The nation's most highly skilled teen-age science technicians were chosen from a field of 30 finalists, shown on this week's cover SCIENCE NEWS LETTER, whose exhibits were the cream of the crop in 13 local and regional science fairs held in the past two months across the country. On Sunday, May 21, awards of $1,000 in scientific equipment were made to the winners.

Boys' Division: Alan J. Fletcher, 18, Warwick, R. I., took first place in physical sciences with his proof of the laws of motion. His exhibit, designed to illustrate and prove the laws of accelerated motion and laws of the pendulum, utilized multiple image photos of bouncing golf balls, balls rolling down inclined planes and pendulums. Measurements from the photos provided the time element necessary to prove these laws of motion.

William G. Horton, 15, of Oneonta, N. Y., won the biological sciences competition with his exhibit on antibiotics. Wishing to learn about the sources of bacteria, the methods of growing them and simple laboratory techniques, William became particularly interested in the antibiotic, bacitracin, produced by a strain of *Bacillus subtilis* which is native to hay and soil. It was Dr. Frank Meleney's work which first attracted William to this subject. His exhibit showed steps in the study of the methods and techniques involved in the production and assay of antibiotics.

Girls' Division: Frances Ann White, 17, of Hyattsville, Md., took first place in physical sciences with a chemical analysis of paper chromatography. Frances' exhibit showed a simplified chemical analysis of the separation of ions and compounds on paper by solvent action and adsorption. Samples of each step in the process were shown.

Martha Mary Schuld, 18, of Philadelphia, won in biological sciences by demonstrating the effects of doubling chromosome numbers in plants. Inspired by Dr. Albert F. Blakeslee of Smith College, who has done extensive work with the effect of colchicine on plants, Martha's charts gave a complete explanation of chromosome doubling in violets and the effects of colchicine on plants. Treated and untreated plants were displayed. All were raised from seed and cared for by her at home. The changes resulting from the experimentation were pointed out by cards and arrows.

Eight other contestants received second and third place awards in their respective divisions. They were:

Second Place Awards:

Anne K. Conant, 17, Dedham, Mass.; Donald H. Richards, 17, Belleville, Ill.; Harry Phillips, 18, Allentown, Pa.; David Kusner, 17, Philadelphia, Pa.

Third Place Awards:

Dominic B. Edelen, 17, Upper Marlboro, Md.; Mary Helen Martin, 17, College Park, Md.; Lenore Y. Taylor, 17, Utica, N. Y.; and Walter L. Morgan, 19, Haverford, Pa.

Fourth Place Awards:

Serge Boutourline, Jr., 18, Cambridge, Mass.; Robert B. Dunston, 18, Point Pleasant, New Jersey; Werner A. Fehlauer, 17, Paulsboro, New Jersey; Terrell Feistel, 18, Oklahoma City, Okla.; Carolyn Freeling, 18, Oklahoma City, Okla.; Theodore S. Garnett, Jr., 15, Norfolk, Va.; Johanna Martha Giese, 15, Norfolk, Va.; Maureen E. Harten, 17, Lincoln, Rhode Island; Lorraine A. Johnson, 17, Point Pleasant, N. J.; Charles L. Kimbell, 17, Hyattsville, Md.; Duane S. Kuhn, 18, Snyder, New York; Morton Lurie, 17, Rockville, Conn.; Helene D. McFetridge, 18, Philadelphia, Pa.; John W. Myers, 16, Norfolk, Va.; Frank Schippell, 18, Norfolk, Va.; Robert E. Welcyng, 16, Glens Falls, New York; Carolyn Kay Wimber, 16, St. Louis, Mo.; Jean Yanelli, 17, Hartford, Conn.

The top four winners received $125 scientific equipment of their own choice, the second place winners received equipment of $75 value and the third place winners received equipment of $50 value. The fourth place awards consisted of $10 worth of Science Service materials.

From Atomic Burst to TV

Among other ingenious exhibits built and displayed by America's young scientists were demonstrations of atomic energy, of how a violin is made, the inner secrets of a papier-mâché earthworm, and an induction furnace heated by high-frequency radio waves.

High-school senior Serge Boutourline, Jr., 18, son of French parents, carried off top honors at the Massachusetts Science Fair with a working atomic-hydrogen furnace using the principles of electrolysis of water.

Oklahoma City's Carolyn Freeling, 17, spotlighted the atomic age with a cotton cloud reproduction centering the scene at Bikini when the fourth atomic bomb exploded. Terrell Feistel, 18, also of Oklahoma, showed a seven-foot-long, boomerang-like model of a flying wing.

Duane Kuhn, 18-year-old from Buffalo, N. Y., built a scale model of a television studio, complete even to hand-carved cameras and lights.

The fair was conducted by newspapers in cooperation with Science Clubs of America, administered by Science Service, Washington, D. C., institution for the popularization of science, whose trustees include members from the National Academy of Sciences, National Research Council, the American Association for the Advancement of Science, the E .W. Scripps Estate and the journalistic profession.

The newspapers cooperating in the First National Science Fair were The Hartford Times, The Washington Daily News, The Boston Daily Globe, St. Louis Star-Times, The Oklahoman and Times, Oklahoma City, The Buffalo Evening News, The Knickerbocker News, Albany, N. Y., The Philadelphia Inquirer, Providence Journal and Bulletin, Norfolk (Va.) Ledger Dispatch, Atlantic City Press, The Ocean County Leader, Point Pleasant, N. J., and The Oneonta (N. Y.) Star.

The judges at the National Science Fair included Dr. James Creese, president of Philadelphia's Drexel Institute of Technology; Roger Conant, curator of Philadelphia Zoological Garden; Peter Abrams, president of Williams, Brown and Earle, manufacturers and distributors of scientific instruments; Cyril N. Hoyler, assistant to the vice-president in charge of research at RCA Laboratories in Princeton, N. J.; Dr. James K. Hunt, technical adviser, public relations department, E. I. du Pont de Nemours in Wilmington, Del.; and Dr. Walter C. Michels, professor of physics at Bryn Mawr College, Bryn Mawr, Pa.

Millikan's Challenge

Today's youth must meet a scientific challenge—"so to understand the world that there may be peace and plenty for all peoples"—Nobel physicist Dr. Robert A. Millikan believes.

This was Millikan's challenge in a message to the 30 high school finalists at the first National Science Fair banquet in Philadelphia.

"The future of science belongs to youth," said Dr. Millikan's statement, which was read at the National Science Fair banquet in Philadelphia.

"Those of us who have attempted to understand the world and the universe expect young scientists to carry on the exploration that the generations of the past began, and the generations of your fathers and grandfathers have advanced at a continuously accelerated pace," the 82-year-old scientist, dean of American physicists, wrote.

He described the finalists of the nationwide science competition as "symbolic of the hundreds of thousands of potential scientists in all the nations of the world."

William G. Horton
Antibiotics
Boys' Division: Biological Sciences

TOP FOUR WINNERS

Martha Mary Schuld
Chromosome Doubling
Girls' Division: Biological Sciences

Alan J. Fletcher
Laws of Motion
Boys' Division: Physical Sciences

Frances Ann White
Paper Chromatography
Girls' Division: Physical Sciences

GERIATRICS

Lifespan May Double in Next Ten Years

➤ THE Fountain of Youth may be just as unattainable as the mythical pot of gold at the rainbow's end, but given a pot of $3,000,000, man's lifespan might be doubled within the next 10 years, in one scientist's opinion.

He is Dr. Thomas S. Gardner of Hoffmann-LaRoche, Inc., Nutley, N.J. He would use the money for research in a new branch of science, gerontotherapeutics. The long word means treatment for slowing down the aging rate or preventing the development of many or most of the ailments of the aged and aging.

Dr. Gardner reports increasing the lifespan of fruit flies by 46% through a combination of the vitamins, pantothenic acid and pyridoxine and another chemical, sodium yeast nucleate. At an American Chemical Society meeting in Passaic, N.J. he urged further testing on animals of known favorable discoveries in the biology of aging.

Science News Letter, May 27, 1950

MEDICINE

Aureomycin and Terramycin Fight War Wound Germs

➤ IF the cold war turns hot and bombs start dropping on our cities, aureomycin, the golden yellow drug from a mold, and the newer antibiotic, terramycin, may prove valuable for treating gas gangrene and other serious wound infections.

In preliminary trials with mice, these mold drugs gave "excellent" results in infections with one war wound germ, *Clostridium septicum*, Drs. Eleanor A. Bliss and Patricia Todd Warth of the Johns Hopkins Medical School reported to the Society of American Bacteriologists meeting. Treatment could be delayed as long as four hours after infection and still give these excellent results.

Chloromycetin, on the other hand, was not effective.

Work is now under way to learn whether the two mold remedies will be equally effective in gas gangrene and tetanus, which are caused by related germs.

Science News Letter, May 27, 1950

MEDICINE

Newer Antibiotics May Conquer Fungus Diseases

➤ FOUR of the newer antibiotic drugs hold promise of conquering fungus diseases of the body for which no other specific remedies have yet been found, three scientists from the Army Medical Department Research and Graduate School reported at the meeting of the Society of American Bacteriologists in Baltimore.

The diseases are: blastomycosis, also called Gilchrist's disease, in which lungs, bones, liver, spleen and kidneys are affected; histoplasmosis, characterized by enlargement of the liver and spleen with fever, anemia and reduced number of white blood cells; and coccidioidomycosis, better known as San Joaquin Valley fever or simply valley fever, which affects the lungs and in its beginning stages resembles tuberculosis.

The fungi causing these diseases are stopped by polymyxin B, aureomycin, chloromycetin and neomycin. Penicillin and streptomycin have not been successful as remedies for the diseases and streptomycin in test tube experiments stimulated growth of the fungi.

The Army scientists reporting this work are Drs. C. C. Campbell, S. Saslaw, and S. K. Strong.

Science News Letter, May 27, 1950

PHYSIOLOGY

"Ma-Ma" Sound Is an Accident

➤ WHEN baby first starts to say "ma-ma" it is nothing but a physiological accident, having something to do with digestion and feeding processes, Dr. Harold Westlake, director of the speech and hearing clinic of Northwestern University, stated at a conference of the Child Research Clinic of the Woods Schools in Langhorne, Pa.

As a further blow to maternal pride, he said that baby says "ma-ma" before "da-da" because in the early stages "mouthing, biting and babbling are related."

Science News Letter, May 27, 1950

MEDICINE

TB Danger Greater For Germ Handlers

➤ A NEW tuberculosis hazard is seriously worrying public health authorities, it was revealed at the meeting of the Society of American Bacteriologists in Baltimore by Dr. A. G. Wedum, chief of the Safety Division of the Defense Department's Biological Warfare Center, Camp Detrick, Md.

The problem arises partly from the number of bacteriologists and other scientists working with tuberculosis germs in the search for better remedies such as streptomycin, and also from the fact that a new culture medium for growing the organisms outside the body allows growth of many more of them in each test tube.

In one laboratory six out of nine workers have come down with TB, Dr. Wedum said. He stressed that no work with tuberculosis is going on at Camp Detrick. His interest in the problem is in teaching fellow bacteriologists the new safety method developed at Detrick for their protection.

Science News Letter, May 27, 1950

IN SCIEN

EMBRYOLOGY

Earliest Human Life Observed 60 Hours Old

➤ THE earliest beginning of human life yet observed is a two-cell fertilized human egg, termed a morula, aged 60 hours.

This youngest fertilized human egg was reported to the International and Fourth American Congress on Obstetrics and Gynecology in New York, by Drs. Arthur T. Hertig and John Rock of the Free Hospital for Women, Brookline, Mass., Harvard Medical School, Boston, and the Carnegie Institution of Washington department of embryology at Baltimore.

It measures 178.5 micra, or about seven-thousandths of an inch, in diameter when flushed out of the Fallopian tube from ovary to uterus in a woman whose uterus had to be removed surgically.

Next youngest fertilized human egg was one about four and one-half days old, also observed by Drs. Hertig and Rock.

Science News Letter, May 27, 1950

MEDICINE

Find Why Uterine Tissue Invades Other Tissue

➤ DISCOVERY of one cause of a painful disease which has been increasing rapidly among American women during the past 20 years was announced by Dr. Richard W. TeLinde and Roger B. Scott of Johns Hopkins Medical School at the meeting in White Sulphur Springs, W. Va., of the American Gynecological Society.

The disease is endometriosis. It is not cancer, but is an invasive disease in which the tissue which lines the inside of the uterus, or womb, invades surrounding tissue. It is the only known human condition in which non-cancerous tissue has this ability to invade surrounding tissue.

One cause, the Hopkins scientists reported, is the retention within the abdominal cavity of uterine lining tissue normally sloughed off during menstruation.

Discovery of this cause was made after the scientists found a way of inducing the disease in monkeys. Success in producing it in the monkeys followed years of fruitless efforts to induce it in laboratory animals so that its cause and treatment could be studied.

The disease is especially prevalent among women in higher income brackets. Pregnancy is believed to cause at least temporary regression and normal or X-ray-caused menopause will arrest it. Male hormone treatment sometimes gives temporary relief but as a rule surgical removal of the involved organs is necessary.

Science News Letter, May 27, 1950

E FIELDS

PSYCHOLOGY

Affection Needed by Child for Normal Growth

➤ MENTAL and physical development may be slowed in a normal child to the point of backwardness if he is denied affection.

Respect for the child's abilities, however limited, helps to supplement his own efforts, Dr. Ethel B. Waring of New York State College of Home Economics, Cornell University, told a conference in Langhorne, Pa., of the Child Research Clinic of the Woods Schools.

Science News Letter, May 27, 1950

VETERINARY MEDICINE

Scrub Typhus Vaccine To Be Tested

➤ A NEW kind of vaccine against scrub typhus, health menace to natives in the far west Pacific areas and to American troops operating in or occupying such areas, is on its way to Kuala Lumpur, Malaya, for testing.

The unnamed vaccine will also be tested against typhoid fever. An Army Medical Department team, which made the first successful use of chloromycetin as a remedy for scrub typhus and typhoid fevers in Kula Lumpur, will conduct the vaccine tests. Members of the team include Maj. Robert Traub, Capt. Herbert Ley, Jr., Capt. Lyman P. Frick, Lieut. Fred Diercks and Lieut. Vernon Tipton. They will report results to Dr. Joseph Smadel at the Army Medical Center in Washington.

Science News Letter, May 27, 1950

GEOLOGY

Gulf Stream Holds Own Against Icebergs

➤ THE Gulf Stream is holding its own against the largest number of icebergs in years.

Hundreds of bergs have been brought south to the Grand Banks of Newfoundland this year by the cold Labrador Current. So far, where they cross the "cold wall" into warmer waters of the Gulf Stream, they have melted before reaching U.S.-Europe spring shipping lanes, officials of the Navy's Hydrographic Office said.

A Coast Guard ice patrol vessel and search planes from Argentia, Newfoundland, have kept constant vigil. Twice daily the Ice Patrol commander broadcasts bulletins on the location of the bergs to Washington.

The danger area, marked on a daily Hydrographic Office chart by the words "Bergs north and west of this line," was closer to the southern steamer lanes in mid-May than it has been since the ice season began in late March.

But there was no indication as yet that ships would have to swing even further south to "Emergency Track A" of the North Atlantic Track Agreement, William G. Watt of the Navy's maritime security division said.

Science News Letter, May 27, 1950

PSYCHIATRY

Mental Patient Must Want to Be Helped

➤ ONE of the chief reasons for failure of psychiatric treatment is that the patient is taking the treatment with an ulterior motive. He may, for example, be trying to prove that his wife is responsible for all his emotional difficulties.

Or the patient may be going to a psychiatrist because his relatives urged it, or, as in the case of sex deviates or perverts, because of pressure by courts. Failure in such cases is due to insufficient desire on the part of the patient to take treatment and to get well.

Psychiatric treatment is not something that can be forced on anyone, Dr. Louis Koren and associates of the Wayne County Mental Health Clinic conclude from a survey of 268 patients accepted for treatment during the first year of the clinic. The findings were reported to the American Psychiatric Association.

Science News Letter, May 27, 1950

MEDICINE

Anti-Bread Mold Chemical Remedies Eye Infections

➤ A CHEMICAL used to check mold in bread and cake is proving useful in treatment of eye infections, Dr. Frederick H. Theodore of the Mount Sinai Hospital and the Manhattan Eye, Ear and Throat Hospital, New York, reports in the JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION (May 20).

The chemical is sodium propionate. It is a salt of one of the fatty acids and is related to fatty acids found in human sweat. It stops some common bacteria, such as the staphylococci which is a very common cause of eye infections, and also some fungi that cause skin trouble.

Dr. Theodore has used it in some 1,200 cases of infections of the outer part of the eyes and eyelids, such as conjunctivitis, blepharitis and keratitis. The results in the average acute infection are as good, he says, as with any of the newer antibiotics and the chemical has the added advantages of being inexpensive, stable and not causing any allergic reaction.

Science News Letter, May 27, 1950

ANTHROPOLOGY

Teeth of South African Ape Man Little Like Man's

➤ GETTING the teeth into the question of whether modern man had ancestors or cousins in South Africa thousands of years ago, Dr. S. Zuckerman, anatomist of the Birmingham University Medical School in Birmingham, England, finds that the teeth of the South African fossil ape men resemble those of two human types far less than they do those of existing apes.

The large-toothed Australian aboriginal and the medium to small-toothed ancient Egyptians are less like the ancient Australopithecus fossils from South Africa than the teeth of the orang and gorilla.

Science News Letter, May 27, 1950

MEDICINE

New Drug May Be Tested Against Next Fall's 'Flu

➤ BY next fall or winter when influenza begins its seasonal increase, a new antibiotic drug may be ready for trial against it. The drug is called subtilin, because it comes from the germ, *Bacillus subtilis*. Mixed with influenza A and B viruses and injected into chick embryos it destroyed the virus in 100% of the specimens, Dr. A. J. Salle, of the University of California at Los Angeles reported to the Society of American Bacteriologists in Baltimore.

The material has not been tested on animals or on humans. It is not a new antibiotic, but only recently has a manufacturer (Commercial Solvents) been interested in making it in large enough quantity for animal tests. It is not yet on the market. It also is effective against the virus of the serious Newcastle disease of poultry.

Science News Letter, May 27, 1950

MEDICINE

Sugar Level in Blood Clue to Cancer Detection

➤ THE blood of cancer patients contains more of certain sugars, called polysaccharides, than the blood of normal persons, six scientists at the University of Oklahoma School of Medicine in Oklahoma City have found.

Finding this difference between the blood of cancer patients and that of normal persons may lead to a diagnostic test by a procedure which would take from eight to 24 hours, reports the American Cancer Society which financed the research.

The scientists are Drs. M. R. and C. L. Shetlar, Janeal Villet Foster, Keith H. Kelly, R. S. Bryan and Mark R. Everett.

The increased amount of polysaccharides in the blood was found in 96% of a series of 105 cancer patients.

Science News Letter, May 27, 1950

ASTRONOMY

Vega Now Brightest Star

Two planets are visible on June evenings. The summer solstice, or the date at which the sun begins to move southward again, is June 21, the beginning of summer.

By JAMES STOKLEY

➤ WITH the coming of June and, for us in the northern hemisphere, the shortest nights of the year, we have the fewest hours for looking at the stars. However June also brings us the beginning of summer (this year on June 21 at 6:37 p.m., EST) so perhaps warmer nights compensate for the shorter time that is available.

In any event the skies of early summer nights are now with us. The accompanying maps show their arrangement as they appear around 10 o'clock at the beginning of June and an hour earlier at the middle of the month. (Add one hour if you are on daylight time.)

Stars Brighter than Planets

Although two planets can now be seen in the evening skies, they are excelled in brightness by some of the stars. High in the east is Vega, the most brilliant, in the constellation of Lyra, the lyre. Just above the northwestern horizon is found Capella, in Auriga, the charioteer. Actually it is only slightly fainter than Vega, but its low altitude makes it appear considerably dimmer than normally. High in the south in the figure of Boötes, the bear-driver, we find Arcturus. This star comes next, though it is also nearly as bright as Vega.

Third in brightness among the stars and planets shown high enough to appear at reasonably full brilliance is Mars in the southwest. It is now in the direction of the constellation of Virgo, the virgin. It is of distinctly orange-red color and its steady light, so different from the twinkling stars, helps one to identify it as a planet. These shine by reflected sunlight, unlike the stars which are far distant suns, each a source of light itself.

The star Altair, in Aquila the eagle, to the right of Lyra and a little lower is next in our order of brightness. It also, being rather low, is somewhat dimmed. Then comes our second planet, Saturn, which is in the group of Leo, the lion, and a little to the right of Mars.

Among the stars again we next come to Spica, in Virgo, to the left of Mars. Then comes Antares, in Scorpius the scorpion, low in the south. This star is another made dim by its lowness. The same is true of Deneb, in Cygnus the swan, just below Lyra in the northeast. Pollux, in Gemini the twins, still remains visible in the northwest to the left of Auriga. It is also near the horizon. And then comes Regulus, in Leo, toward the west and to the right of Saturn.

The stars mentioned are all of the astronomer's first magnitude. The others shown on the maps are still fainter, of magnitudes two, three and four. However, some of these form conspicuous groups. Notable among them is the Great Dipper, high in the north, with the pointers which show the direction of Polaris, the pole star. The dipper is part of Ursa Major, the great bear. The handle of the dipper forms its long and quite unbearlike tail. Followed around to the south, incidentally, the curve of the handle brings you to Arcturus.

The pole star is at the end of the handle of the little dipper. It is part of the lesser bear, Ursa Minor. Between the two dippers can be seen part of the large but rather faint constellation of Draco, the dragon. The monster's head is to the right of the bowl of the little dipper, toward Vega and under Hercules, the champion. The long, snake-like body extends downward a little, then curls upward and down again toward the great dipper.

Summer Solstice

The event which occurs on June 21, at 6:37 p.m., EST, is the summer solstice—the time when the sun which has been moving northward through the sky since last December reaches the limit of its travels. From then on it is moving southward again, and will reach the other extreme on Dec. 22. This is the date of the winter solstice.

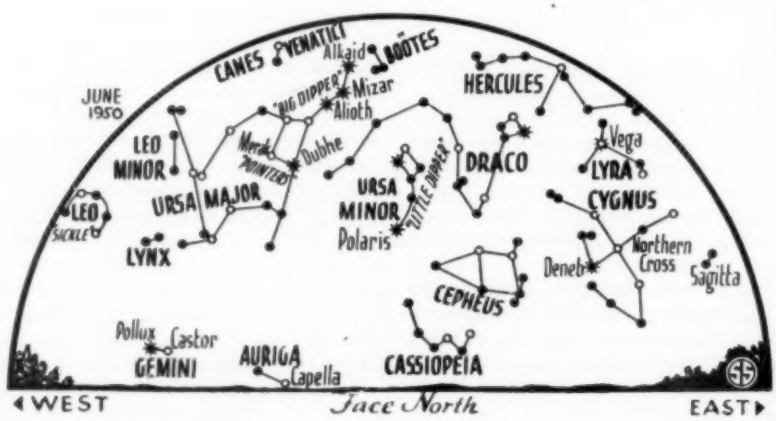
For those of us who live in the north temperate zone, the sun moves each day from its easterly rising point across the southern sky to its setting in the west. In December when the sun is far to the south, the sunrise point is well south of due east. Similarly it sets considerably south of due west. Its maximum height, at noon, is relatively low. Thus it has a short path from sunrise to sunset, and a much longer one from setting to rising. We, therefore, have short days and long nights.

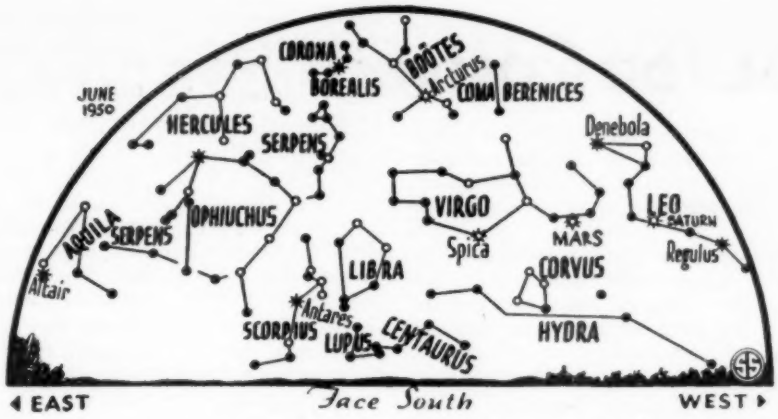
Conditions now are reversed, for sunrise is well to the north of east and sunset an equal distance north of west. The noonday sun climbs well up toward the zenith, so it has a long daytime path and a short one at night. This is one of the reasons for warmer weather. Naturally, with the sun above the horizon for about 15 hours (as it is at 40 degrees north latitude in mid-June) its warming effect on the earth is considerably greater than it is in December. Then it is below the horizon for about 15 hours and above for only nine.

Angle of Sun Rays

However there is another and even more important factor involved. That is the angle with which the sun's rays strike the ground. Imagine a yard square beam shining from directly overhead. Then the energy would cover just a square yard, and would be as concentrated as it could be without the aid of some optical device. At 40 degrees north latitude on June 21, the sun at noon is only 16.5 degrees south of the zenith, so its rays are nearly vertical.

In contrast, on Dec. 22 we see the noonday sun low in the south—only 26.5 degrees above the horizon, or 47 degrees lower than at noon in June. Now consider what happens to our yard-square beam. It strikes ground at such a low angle that it covers approximately two square yards, so its heating effect is halved. Thus at the winter solstice because of the combination of both these effects, we get the least heat from the sun, while at the summer solstice





we get the most. In the southern hemisphere, of course, the effect is reversed. Then the sun travels across the northern sky each day, so it is low in June and high in December.

In view of this it might be thought that June 21 would mark the middle of summer rather than the beginning. In England St. John the Baptist's day, June 24, approximately the date of the summer solstice, is actually called Midsummer Day. It is one of the "quarter" days, marking the dates at which rents, etc., which are due quarterly are to be paid. The others are Christmas, March 25 and Michaelmas Day, Sept. 29.

Probably these are survivals of the time when the new year began not on Jan. 1, but at the beginning of spring about March 25. With June 25 the middle of summer rather than the beginning, that season covers the whole time of year when the sun is highest in the sky. With the system we use of beginning summer on June 21, we have the curious condition that on the last day of summer, Sept. 22, the height of the sun is about the same as on March 20, the last day of winter.

Logic to Solstice Theory

However, it is an undeniable fact that the warmest weather of the year comes well after the summer solstice, and that the season from this date to Sept. 22 covers roughly the hottest time of year. This is because the earth itself acts as a reservoir for the heat that the sun gives it.

For some weeks after June 21 the ground each day will take in more heat than it gives off in the same period. Temperatures therefore rise. Finally toward the end of July, income and outgo become equal and after that the loss of heat each day becomes greater than the gain. Therefore it gets cooler.

Similarly, because it is not until well into January that the daily gain exceeds the loss, the coldest weather of the year comes a month or so after the winter solstice. Thus, there is really some logic to the custom of taking June 21 as the first rather than the middle of summer!

Time Table for June

June	EST	
6	11:37 a.m.	Moon passes Jupiter
7	6:35 a.m.	Moon in last quarter
9	10:00 p.m.	Mercury farthest west of sun
12	1:00 a.m.	Moon farthest, distance 252,200 miles
	2:47 a.m.	Moon passes Venus
15	10:53 a.m.	New moon
21	5:43 p.m.	Moon passes Saturn
	6:37 p.m.	Sun farthest north, summer commences
23	12:12 a.m.	Moon in first quarter
	6:29 a.m.	Moon passes Mars
27	4:00 p.m.	Moon nearest, distance 224,900 miles
29	2:58 p.m.	Full moon

Subtract one hour for CST, two hours for MST, and three for PST.

Science News Letter, May 27, 1950

AERONAUTICS

Cheap Wind Tunnel for Supersonic Studies

➤ A "SHOCK tube" type of wind tunnel for studies in supersonic air velocities, under construction at the University of Illinois, is inexpensive in cost when compared with giant tunnels now in use but is effective in studying behavior in speeds up to 1.8 times the speed of sound.

This tunnel will cost $25,000, instead of $500,000 for a comparable standard wind tunnel. The tube, made of 1.75-inch thick aluminum, is 35 feet long, four inches wide and 15 inches high. It is modeled on the pioneer device of this sort which is at Princeton University in New Jersey.

The shock tube, as described by University scientists, will operate something like the result of sticking a pin into a balloon. A thin sheet of tough plastic will be stretched across inside the tube six feet from one end. Air pressure will be increased in the short part of the tube behind this sheet while in the rest of the tube the pressure will be lowered.

Then a pin will prick the plastic, making it split in all directions like a burst balloon. A shock wave will then rush the length of the tube. Inside the tube, near the low pressure end, will be a model of an airplane wing or other object. Shock wave photographs will be taken to show the air movements over the model during the very short period of the high-speed blast.

Science News Letter, May 27, 1950

DENTISTRY

Teeth Anesthetics Made to Last for Week

➤ THE local anesthetic effects of the procaine, or novocaine, that dentists inject before painful drilling and tooth pulling, can be made to last more than a week instead of the usual two to four hours, Drs. Samuel Monash and Alvo Guiducci of New York reported at the meeting of the Medical Society of the State of New York.

The longer lasting effect is achieved by a special method of preparing a suspension of procaine base in water.

Science News Letter, May 27, 1950

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AGRICULTURE

Wood Chip Diet for Corn

➤ WOOD chips will be worked into a Connecticut corn field this summer, plus heavy doses of a nitrogen-giving fertilizer. The question the corn will have to answer is whether it likes the new diet.

If it does, a five-year project just begun by the Connecticut Agricultural Experiment Station may pay off with a double-barreled boon to U.S. foresters and farmers.

On the farm, it may open a whole new field of bolstering the organic content and hence the quality of the soil by use of waste cellulose materials such as wood chips and bark.

To the forester or woodlot owner, it could provide a market for more complete utilization of each tree cut. Normally about 60% of a tree cut for saw lumber is left behind as sawdust, trimmings, shavings, bark, branches and twigs.

If such materials could be used to bolster soil, a farmer in soil-poor regions conceivably could use a sawmill's waste to upgrade his land and, eventually, its yield.

The hitch is that when cellulose material such as wood chips is added to soil, it competes with crops growing there for the available nitrogen. Micro-organisms in the earth rob the plants of nitrogen while decomposing the wood waste. The plants temporarily take on a nitrogen-poor yellowness.

The Connecticut scientists, headed by Dr. H. A. Lunt, are experimenting with giving the land a booster shot of nitrogen fertilizer at the same time the wood chips are added.

Ammonium nitrate is being used in greenhouse pots where beets and spinach are growing in soil mixed with wood chips. This summer, corn will be used as a guinea-pig crop in the field.

In Connecticut, combinations of oak and hickory, aspen and gray birch, and red and white pine chips are being used in the present tests.

In Columbus, Ohio, similar experiments are being carried on with bark at Battelle Memorial Institute, a leading industrial and agricultural research laboratory. Scientists there are seeking ways to fortify bark with nitrogen to overcome its toxic effect on plants.

Science News Letter, May 27, 1950

ENGINEERING

Sewage Water Reclaimed

➤ THE reclamation of water from sewage, and its reuse after purification, was advocated in Los Angeles at the meeting of the American Society of Civil Engineers by A. M. Rawn of Los Angeles County Sanitation District.

Reclamation of water from sewage is not a new idea, he stated. The reuse of sewage or sewage effluent is well established for agriculture, industry and, after some natural purification process, for domestic purposes. The plan is proposed for urban areas facing a water shortage.

Water reclamation from sewage depends, he emphasized, upon the application of sound, established engineering principles applied with two basic concepts in mind. First, it is essential that the process of reclaiming water from sewage be based on the water requirement and not on the need for treating the sewage. Second, public acceptance of unrestricted reuse of sewage waters depends upon the inclusion of a natural purification process such as blending the reclaimed water with a lake, a stream or with underground water.

The problem of future Los Angeles was in the mind of Mr. Rawn in advocating water reclamation from sewage. About one-third of the water for this fast growing city comes from the Owens and the Colorado rivers. Two-thirds of the total water used in the metropolitan area is still from ground sources, the meeting was told by Harold E. Hedger of the Los Angeles County Flood Control District.

Population growth and industrial expansion have resulted in both overdraft and declining yields from underground basins, he declared. This necessitates a program of progressive well deepening. Pumping from wells along the coast, from Long Beach to Hermosa Beach, has lowered the water table as much as 70 feet. The encroachment of salt water has caused the abandonment of important wells closer than a mile from the shore line.

General plans for water reclamation plants to be established adjacent to sewage treatment plants were discussed by him. From them the reclaimed water would be pumped to spreading grounds to enter the soil and add to the groundwater, or into recharge wells.

Science News Letter, May 27, 1950

MEDICINE

Advances Against Polio Listed as Cases Mount

➤ AS infantile paralysis cases begin their seasonal increase, the National Foundation for Infantile Paralysis in New York issued a list of three promising advances in the fight against the crippling disease.

The three advances are: 1. Growth for the first time of the polio virus in non-nervous tissue in test tubes. Great quantities of the virus would be needed should a vaccine be developed.

2. Classification by National Foundation grantees of three distinct types of polio virus. The search for all types, under way since Jan. 1, 1949, is expected to be completed by the end of 1951.

3. Improved techniques of rehabilitation and of mechanical devices that can reduce to "an absolute minimum the number of patients who suffer permanent disability."

The year 1949, which saw the nation's worst polio epidemic, is termed the "likely turning point in the history of the disease."

"We may be able to halt the rising tide of polio in the not too distant future," Basil O'Connor, National Foundation president, declared.

Science News Letter, May 27, 1950

AGRICULTURE

Kansas Wins 1949 Wheat Championship

➤ THREE states supplied a third of the overall U.S. wheat crop in 1949, the Department of Agriculture reported.

Kansas won the wheat championship with 164,000,000 bushels. North Dakota was runner-up with 111,000,000 bushels. Texas grew 103,000,000 bushels.

The seven other states in the "Big Ten," which supplied 70% of U.S. wheat last year, were Oklahoma with 89,000,000 bushels, Montana with 64,000,000, Ohio with 60,000,000, Washington with 57,000,000, Nebraska with 54,000,000, Colorado with 50,000,000, and Illinois with 49,000,000 bushels.

Science News Letter, May 27, 1950

METEOROLOGY

Weather Pattern Warns Of Forest Fire Conditions

➤ FASTER prediction of when and in what general areas in the Great Lakes region dangerous forest fires are apt to occur is now possible.

Advance warning of conditions that might lead to large-scale burning of forest lands would help to save much of the timber that now disappears as smoke each year. It might also help to save or limit fire-damage to towns, such as Rimouski, Quebec.

The advance information on likely periods of high burning comes from weather maps. Mark J. Schroeder of the U. S. Weather Bureau, Chicago, has found that a certain weather pattern usually accompanies the spring fire season in the Great Lakes area.

A high pressure area in the Hudson Bay region will give the Great Lakes states fire trouble. Blue skies and few clouds, those usually high, normally accompany a high pressure area.

Science News Letter, May 27, 1950

MATHEMATICS-ENGINEERING

Atom-Smasher Uses Coils

➤ A NEW type of atom smasher, known as a "non-ferromagnetic synchrotron," is under development, Dr. C. G. Suits, research director of General Electric, revealed in Schenectady. The huge iron-core electromagnet, common in most atom-smashing machines, is omitted in this. Coils are employed instead.

Ultimately it will produce X-rays of 300,000,000 volts, it is expected. It has been operated thus far up to about a million volts and probably will be in operation at much higher energies before the year is out. It is being built under the sponsorship of the U. S. Office of Naval Research, and is to be used to study the effects of high-energy radiation, particularly in nuclear research.

Instead of the huge iron-core electromagnet usually employed to produce the required powerful magnetic fields, these fields are produced by specially designed coils of wire. These carry heavy currents, and are contained in a tank from which air has been exhausted.

An electromagnet weighing eight tons was used in the first operating synchrotron in the United States. Later, more powerful models employ electromagnets up to 130 tons in weight. The first was an 80,000,000-volt machine. Later models produce 300,000,000-volt radiation.

In this new General Electric synchrotron, there is a cylindrical tank 26 inches in height and 6.5 feet in diameter. It has one-inch-thick walls. Inside there are a group of coils, Dr. Suits explained, for obtaining initial betratron acceleration and subsequent synchrotron operation.

There is no separate doughnut-shaped vacuum tube, as in the earlier models, because the entire tank is evacuated and the electrons move in the space between the inner and outer coils.

During the first operation the vacuum was about a hundred-millionth of an atmosphere. This allowed enough gas molecules to remain to cause appreciable scattering of the electrons, though it does not prevent operation. As the vacuum is improved, to a billionth of an atmosphere or better, the scattering may decrease accordingly, Dr. Suits stated.

Science News Letter, May 27, 1950

MATHEMATICS-ENGINEERING

Baby Brains Aid Big Ones

➤ NEW arithmetic machines of small size, now completed, might be called "Little Brains" in contrast to the "Giant Brains" they supplement.

They are special machines for special problems, but like their predecessors are electronic computers and solve in seconds what might require days or even months by other means.

At least two have been recently revealed. One is the "Maddida" and is designed specifically to solve differential equations. Its full name is "Magnetic Drum Digital Differential Analyzer." It was constructed by Northrop Aircraft, Hawthorne, Calif., for the U. S. Air Force. It weighs about as much as an adding machine.

Although small, it is said to possess more mathematical capacity than the largest differential analyzer now in use. This large computer, built by the Massachusetts Institute of Technology, has an 18 integrator capacity, thousands of vacuum tubes and relays and hundreds of motors.

It occupies a large room and weighs several tons. Maddida has 22 integrators, 56 vacuum tubes, no relays, one motor, weighs 60 pounds, and occupies just a table-top of space. It gets accuracies of one part in a million, it is claimed.

The other "little brain" is a development of the Potter Instrument Company, Flushing, N. Y. Although it can do complicated arithmetic, it is not claimed to be a "giant brain." It imitates factory work and conditions at a tremendously accelerated rate to determine production schedules and wages.

It is called a "Time Study Computer." It will calculate pay for both working and waiting time, and enable industry to attain the most economical combination of men and machines. It is a specialized application of electronic computer principles to do the work that until now has required a large staff of statisticians on schedules and payrolls.

This computer can simulate the operation of ten of the machines used in the factory at the same time. Built in three panels each six feet high, two feet wide and 20 inches deep, the time study computer can be plugged into a wall socket. It costs approximately $15,000 to build. One girl can operate it by setting dials from work slips. No more skill is required than for operating an adding machine.

Science News Letter, May 27, 1950

AGRICULTURE

Wool Grows Faster in Summer, Not Winter

➤ WOOL grows faster on sheep in the summer and early fall when they ordinarily have the best feed. This finding contradicts the generally-held belief that sheep's wool grows best during the winter months.

It resulted from tests by Dr. John I. Hardy of the Agricultural Research Center in Beltsville, Md., made to determine the exact growth rate of wool fibers.

The wool-growth clippings were taken from sheep there and at eight cooperating state agricultural experiment stations immediately after shearing time every year. After 28 days for the medium and coarse wools, and 42 days for the fine wools, two small tufts of fibers were removed from each of the test sheep. These were then carefully measured to find the growth rate.

Science News Letter, May 27, 1950

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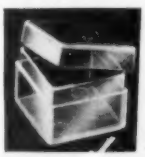

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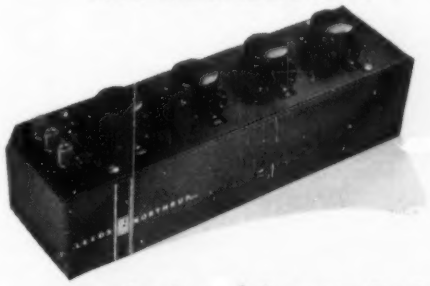

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ENTOMOLOGY

NATURE RAMBLINGS

Ants

➤ THE next time an ant takes a short cut across your picnic cloth, it may put matters into perspective to reflect that ants were here before we were. Long before.

On the evidence of ant fossils preserved in amber, it is known that at least thirty million years ago ants were living together just as they are today, in large communities, with a caste system, with division of labor. Man is a mere Johnny-come-lately, with a scant million years behind him.

Ants are prodigious athletes in proportion to their size. They can lift a weight 400 times their own weight. Theoretically a five-pound ant could easily lift a ton. Luckily five-pound ants are unknown.

Despite their small bulk, ants display a great range of size from the smallest ant to the largest, even within the same species. The largest ant of a species may weigh several thousand times more than the smallest. Among humans, even considering obese giants at one extreme and dwarfs at the other, the factor does not exceed 30 times.

Ant colonies consist of not just two, but three sexes: males, females, and neuters. The neuters, who are the workers, are anatomically female, but sterile. The so-called queen is a sexually mature female. There may be several such fertile females in an ant colony.

The workers are wingless. Only the males and females have wings, which are used but once, during the nuptial flight. Shortly before swarming time, males and females will be produced in great numbers. The colony is a bustle of activity. The workers keep the adults in check until the weather is propitious. Warm windless days seem to be preferred, because when such a day comes, from all ant colonies in the neighborhood clouds of males and females will swarm skyward in the nuptial flight.

Males and females pair off in what is destined to be the first and last youthful fling for both of them. The female will immediately burrow herself a home in the earth or move in on an established colony. In any case, she will keep the sperm she received on her nuptial flight in a special pouch in her body, and will use them to fertilize all the eggs she will produce for the rest of her life. The bridegroom, having fulfilled his biological destiny, wanders off, loveless, homeless, and alone, doomed to an early death.

If it is warm and airless the day of your picnic, take a close look at the ant before you flick him off into the tall grass. If he has wings, he is probably a bridegroom, perhaps dazed at the breath-taking brevity of his honeymoon. If he has wings, treat him gently, for his hours are numbered.

Science News Letter, May 27, 1950

ENGINEERING

Motor Stops and Starts In Four Milliseconds

➤ A SMALL electric motor at the National Bureau of Standards in Washington can be stopped and started again in the reverse direction in four-thousandths of a second. The device is used primarily for employment in the "giant brain" electronic computing machine but it may have many other applications.

It is relatively easy to stop a motor rapidly with brakes, but rapid starts either in the same direction or in reverse are limited if electromagnetic means alone are used. In the Bureau's new rapid-reversal motor, the energy of the rotor which would be dissipated as heat during braking is stored in a spring for use in restarting.

In the experimental work at the Bureau, a small two-phase motor operating at 3,200 revolutions per minute was used. The reversal spring consists of a steel torsion bar 31 inches long and less than a half inch in diameter. Only one phase of the motor is connected to the alternating-current power supply; thus the motor will rotate in the starting direction.

The motor shaft is rigidly connected to one end of the torsion bar, which is equipped at the other end with two positive unidirectional clutches. One clutch prevents clockwise rotation and the other rotation in the opposite direction. If the motor is rotating in a clockwise direction and the proper clutch is engaged, torsion brings the rotor to a stop in approximately 20 degrees. The energy stored in the torsion bar is then returned to the rotor to cause a counterclockwise impulse. Full speed in reverse is obtained in two milliseconds.

Science News Letter, May 27, 1950

METEOROLOGY

Summer Arrives Ahead Of Schedule This Year

➤ SUMMER will be ahead of schedule this year, the U. S. Weather Bureau's 30-day extended forecast shows.

Temperatures averaging warmer than seasonal normals were predicted for the next four weeks—from mid-May to mid-June—over most of the country.

Only region where cool weather may persist is in the northern Rocky Mountain states and the Dakotas. Even there, however, the Weather Bureau forecast "a welcome change" from the long-lasting cold spell which has compounded the woes of the flood-swept border valley of the Red River between North Dakota and Minnesota.

To anxious river towns up and down the Midwest, the 30-day outlook on rainfall offered some solace from flood threat.

Rain "equal to or in excess of the seasonal normal" over most of the country is the prediction. But conspicuously missing from the forecast is the word "abundant", which the Weather Bureau used in its last two outlooks on future rainfall.

There is no indication that abnormally heavy rains will further harass flood danger areas, Jerome Namias, chief of the extended forecast section declared.

In three corner pockets of the United States, the extreme southwestern, southeastern and northwestern sections, there will even be some deficiency in rainfall, the forecast showed. That will be good news particularly in the Pacific Northwest, where the Columbia River has a definite flood potential unless rain holds off while winter snows come off mountain watersheds.

Where it will do good, rainfall is expected in the dry dust bowl area of southeastern Colorado, Oklahoma, northwestern Texas and northeastern New Mexico.

Science News Letter, May 27, 1950

CHEMISTRY

Silicone-like Boron Compounds Foreseen

➤ A CHEMICAL wedding between the element boron and organic substances promises to give industry a new family of compounds that may even rival the recent joining of silicon, carbon, oxygen and hydrogen to form the versatile new silicone plastics, lubricants and waterproofing substances.

At the American Chemical Society meeting experiments on new organoboron compounds, as they are called, were reported by Dr. H., C. Mattraw of the General Electric Co., Schenectady, N.Y. and Dr. A. W. Laubengayer of Cornell University.

Boron is an element in the chemical scheme of things that is lighter than silicon but similar to it in many respects. In organic compounds it can be made to hitch its molecules into big chains that produce useful materials like rubbers, plastics and other liquids and solids.

Exploring how these new compounds behave, the two chemists found that they are similar to typical silicone compounds and to hydrocarbons. Butyl boric acid joins with polyvinyl alcohol, for example, as would be expected if it were to make a potential plastic.

Science News Letter, May 27, 1950

• Books of the Week •

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THE AMERICANA ANNUAL 1950: An Encyclopedia of the Events of 1949—Lavinia P. Dudley and John J. Smith, Eds.—*Americana Corporation,* 788 p., illus., $10.00. Over 200 authorities write on the nation's events of last year.

AT PADDY THE BEAVER'S POND: A Book of Nature Stories—Thornton W. Burgess—*Little, Brown,* 146 p., illus., $2.00. Stories on outdoor life are presented. For all young nature lovers.

BIOLOGICAL ASPECTS OF AIR POLLUTION: An Annotated Bibliography—Harry Heimann, H. Morton Brooks, Jr. and Donald G. Schmidt—*United Steelworkers of America,* approx., 125 p., paper, 50 cents. A brief review of each article is presented.

CELL GROWTH AND CELL FUNCTION: A Cytochemical Study—Torbjoern O. Caspersson—*Norton,* 185 p., illus., $5.00. A research report on the basic life process in living cells which has been carried out at the Karolinska Institute in Sweden for the past 15 years. The book is based on the author's Thomas W. Salmon Memorial lectures.

COLD CATHODE FLUORESCENT LIGHTING—Henry A. Miller—*Chemical,* 130 p., illus., $3.75. Fundamentals of fluorescent lighting.

COMMUNICATION CIRCUIT FUNDAMENTALS: For Radio and Communication Engineers—Carl E. Smith—*McGraw-Hill,* 401 p., illus., $5.00. A text in circuit fundamentals for the advanced student or engineer.

A COURSE IN GENERAL CHEMISTRY: Semi-Micro Alternate Form—William C. Bray, Wendell M. Latimer and Richard E. Powell—*Macmillan,* 3rd ed., 217 p., illus., $3.00. An introductory text in semi-micro techniques.

FREQUENCY MODULATION—K. R. Sturley—*Chemical,* 98 p., illus., $4.75. The basic principles of frequency modulation or fm. A detailed bibliography is included.

GENERAL CHEMISTRY FOR COLLEGES—Jelks Barksdale—*Longmans, Green,* 504 p., illus., $5.00. An introductory college text.

HAVING A BABY: A Guide for Expectant Parents —Alan Frank Guttmacher—*New American Library,* rev. ed., 191 p., illus., paper, 25 cents. Some of the folklore, the history and the scientific facts of pregnancy and birth are presented in this completely revised edition.

A HISTORY OF EXPERIMENTAL PSYCHOLOGY—Edwin G. Boring—*Appleton-Century-Crofts,* 2nd ed., 777 p., illus., $6.00. A standard reference brought completely up-to-date.

HOW TO BECOME A RADIO AMATEUR—*American Radio Relay League,* 58 p., illus., paper, 50 cents. A wealth of information on how to become an amateur of radio communication.

HOW TO STOP KILLING YOURSELF—Peter J. Steincrohn—*Funk,* 272 p., $2.95. The author writes on how to fight the death instinct which he believes lies deeply buried in all of us. For the layman.

NOTES ON SOME ASIATIC TITMICE—Charles Vaurie—*American Museum of Natural History,* 66 p., illus., paper, 25 cents. This report is taken from the notes of the Walter Koelz Collections; it consists of information collected in Iran, Afghanistan, and India.

PARTNERS WITH NATURE—Ivah Green—*International Textbook,* 112 p., illus., $1.25. Designed to teach youngsters the necessity of conservation.

QUEEN REARING—Harry H. Laidlaw, Jr. and J. E. Eckert—*Dadant,* 147 p., illus., $2.50. Practical methods of rearing queen bees both commercially and at home are discussed.

SEWERAGE AND SEWAGE TREATMENT—W. A. Hardenbergh—*International Textbook,* 3rd ed., 467 p., illus., $6.50. Describes the newest methods in treating sewage and industrial wastes.

A SYSTEMATIC LABORATORY COURSE IN GENERAL CHEMISTRY—Harry H. Sisler and Jay J. Stewart—*Macmillan,* 395 p., illus., paper, $3.00. An introductory lab manual.

TEACHER LISTEN: THE CHILDREN SPEAK—James L. Hymes, Jr.—*New York Committee on Mental Hygiene,* 44 p., illus., paper, 25 cents. A pamphlet discussing some of the motivations underlying everyday "problem behavior" with a view toward helping the teacher to deal with these problems more effectively.

Science News Letter, May 27, 1950

ENGINEERING

Atomic Energy Wastes Pollute Air Less and Less

➤ RADIOACTIVE wastes sent into the atmosphere from U.S. atomic energy plants have been progressively decreased since 1947, scientists reported to the Technical Conference on Air Pollution.

Dr. Abel Wolman, Johns Hopkins University professor and consultant to the Atomic Energy Commission, said "air scrubbers," filters, precipitators and many other methods are being used to prevent contamination of stack gases. Weather forecasts control operations at some atom laboratories, where the stacks are used only when gases will be carried into the upper atmosphere to disperse.

Science News Letter, May 27, 1950

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TRIFOCAL LENSES in the eyeglasses, relatively new but now well tested in actual use, have three sections of power instead of two as in bifocals. They make objects fully clear in the area from 18 to 50 inches from the eye, and do so without the backward head-tilt required with bifocals.

Science News Letter, May 27, 1950

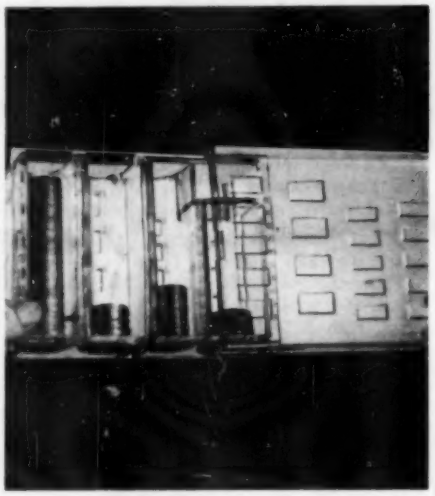
PLANT-FOOD SPRAYER for the lawn, suitable also for insecticides and weed-killing solutions, consists of a plastic jar on a tubular support with a circular base. Water from a garden hose, passing through a center pipe in the jar, picks up a controlled amount of the solution and delivers it to the lawn.

Science News Letter, May 27, 1950

CASTING COMPOUND, said to be neither a metal nor a plastic but with some characteristics of both, can be poured into molds at room temperature and, with the aid of varying amounts of a catalyst, made to set without heat. It forms a tough, hard metallic-appearing casting.

Science News Letter, May 27, 1950

COIN-COUNTER is a transparent plastic box, shown in the picture, for use in stores, restaurants and similar places, with four columns to hold pennies, dimes, nickels and quarters. Coins are placed in the proper column and their total value noted by a calibrated scale beside the column.



Science News Letter, May 27, 1950

VINYON YARN clothing for workers in laboratories and acid plants withstands the destructive chemicals at concentrations widely used in industry. The resistance is inherent in the fibers, and is not due to treatment. The clothing is also fire-resistant and safe to launder by ordinary methods.

Science News Letter, May 27, 1950

PROTECTIVE PADS for railroad ties are made, under pressure, of abaca fiber and Vinylite resin, and are placed between the wooden ties and the steel tie plates under the rails. They lessen the cutting and wearing effects of heavy trains speeding on the tracks.

Science News Letter, May 27, 1950

WORKING STAGE, suitable for uses ranging from painting to apple-picking, has a swiveling base to which are attached two arms, movable together or independently. From a platform at the end of the second arm, a worker can raise himself from a four to a 28-foot height. A small gasoline motor generator provides the power.

Science News Letter, May 27, 1950

FRENCH-FRIER, an improved type for home use, is an all-aluminum, electric deep fryer with an adjustable thermostatic temperature control and a full-view pilot light that tells exactly when cooking oil is ready for use. It is styled for table service, and can be used from popping corn to baking bananas.

Science News Letter, May 27, 1950

Do You Know?

London had *air* pollution regulations as early as 1273.

Five-pound *crabs*, both big and tasty, are caught in the Bay of Biscay near Spain.

Polluting *gases* in the atmosphere are largely acid in character, causing irritation and corrosion.

The fiber plant known as *kenaf* is a good crop for Cuba because it fits into the slack season between sugar cane harvests.

An insecticide known as *lindane* is said to be effective for indoor use to control flies in areas where the pests have become immune to DDT.

Sowing *grass* seed by hand is a wasteful procedure; mixing it with sand is a good method where the hand-sowing method must be used on lawns.

Radio astronomy, a new field in science, includes the detection and interpretation of radio waves which are being sent to the earth from many parts of the universe.

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